Effects of an Enhanced Discharge Planning Intervention for Hospitalized Older Adults: A Randomized Trial

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Purpose of the Study: To identify needs encountered by older adult patients after hospital discharge and assess the impact of a telephone transitional care intervention on stress, health care utilization, readmissions, and mortality. Design and Methods: Older adult inpatients who met criteria for risk of post-discharge complications were randomized at discharge through the electronic medical record. Intervention group participants received the telephone-based Enhanced Discharge Planning Program intervention that included biopsychosocial assessment and an individualized plan following program protocols to address identified transitional care needs. All patients received a follow-up call at 30 days post discharge to assess psychosocial needs, patient and caregiver stress, and physician follow-up. Results: 83.3% of intervention group participants experienced significant barriers to care. For 73.3% of this group, problems did not emerge until after discharge. Intervention patients were more likely than usual care patients to have scheduled and completed physician visits by 30 days post discharge. There were no differences between groups on patient or caregiver stress or hospital readmission. Implications: At-risk older adults may benefit from transitional care programs to ensure delivery of care as ordered and address unmet needs. Although patients who received the intervention were more likely to communicate and follow up with their physicians, the absence of impact on readmission suggests that more intensive efforts may be indicated to affect this outcome.

Key Words: Transitions of care; Psychosocial

Purpose of the Study

Over the past decade, the transition from hospital to home has been identified as a time of heightened risk, particularly for older adults and those with complex health care needs (Coleman, Boult, & American Geriatrics Society Health Care Systems Committee, 2003; Coleman, Smith, Raha, & Min, 2005; Naylor et al., 2004). Adverse outcomes associated with poor transitions and often linked to compliance and continuity of care problems include medication errors, nursing home
placement, caregiver burden, and increased health care costs (Coleman, Parry, Chalmers, & Min, 2006; Forster, Murff, Peterson, Gandhi, & Bates, 2003; Naylor et al., 1999; Summary proceedings: Transitional care leadership summit, 2006). These transitions are common events for older adults. Each year, 22% of Medicare beneficiaries over the age of 65 experience at least one transition involving a hospital stay (Sato, Shaffer, Arbaje, & Zuckerman, 2011). Half of these individuals go through multiple transitions in a single year. Several qualitative studies (Bradway et al., 2011; Fabbre, Buffington, Altfeld, Shier, & Golden, 2011; Graham, Ivey & Neuhauser, 2009) have identified information gaps and inadequate caregiver training as key problem areas for patients and caregivers as they transition from hospital to home.

Complex care transitions can often result in readmission, contributing to a 30-day readmission rate among Medicare beneficiaries of nearly 20% (Jencks, Williams, & Coleman, 2009). Approximately 75% of these readmissions may have been preventable (Medicare Payment Advisory Commission, 2009). This topic has gained national attention as the Centers for Medicare and Medicaid Services implement provisions of the Patient Protection and Affordable Care Act (2010a) that incentivizes hospital–community partnerships for effective transitions (Center for Medicare and Medicaid Services, 2011) and limits payments for hospitals with high rates of potentially preventable readmissions (Patient Protection and Affordable Care Act, 2010b).

Transitional care interventions have emerged as an important strategy in improving health outcomes and preventing readmissions for older adults. The Transitional Care Model and the Care Transitions Intervention have a substantial and solid evidence base (Coleman et al., 2006; Naylor et al., 2004). Both of them begin intervention with in-person hospital visits by trained project personnel, usually advanced practice nurses, continue with home visits, and follow up for several weeks post discharge (Coleman et al., 2006; Naylor et al., 2004). Although these models have been found to have a positive impact on health care costs and re-admission rates, there have been barriers to their adoption including reimbursement challenges and a shortage of nurses with these specialized skills. A third model, Project RED, utilizes nurse advocates to provide discharge teaching in the hospital coupled with a post-discharge telephone contact. This intervention has demonstrated efficacy in reducing readmissions and cost in an unblinded study (Jack et al., 2009). Although these models have been found to have a positive impact on health care costs and readmission rates, barriers to their adoption have included reimbursement issues and difficulties in tailoring the model to patients with highly complex needs (Golden, Tewary, Dang, & Roos, 2010).

The Enhanced Discharge Planning Program (EDPP) was designed to augment rather than replace the inpatient hospital discharge planning practice and build on existing practice. The program began as a pilot to address concerns of hospital discharge planning staff that older adults were especially vulnerable to adverse post-discharge outcomes. EDPP was developed as a telephone-based intervention implemented by masters, prepared social workers with experience in geriatrics and community-based practice, to address needs beyond the scope and purpose of the acute hospital discharge planning process. Researchers hypothesized that problems with the plan of care that emerged post discharge might be particularly problematic. An intervention specifically designed to address psychosocial issues or inadequate access to community services like transportation, homemaker, and social support services—factors that may be responsible for 40–50% of readmissions of older adults—may be particularly beneficial in the early post-discharge period (Brown, Peikes, Chen, & Schore, 2008; Leff et al., 2009; Proctor, Morrow-Howell, Li, & Dore, 2000; Wennberg, Marr, Lang, O’Malley, & Bennett, 2010). Targeting such elements in at-risk older adults could impact adherence to the plan of care and reduce the likelihood of adverse events.

Psychosocial issues such as limited health literacy, lack of self-management skills, unmet functional needs, lack of social support, and living alone have all been associated with adverse outcomes including readmission and mortality (Arbaje et al., 2008; Peek, Baird, & Coleman, 2009). These factors may help to explain high levels of non-adherence to outpatient medical follow-up visits. Jencks and colleagues (2009) found that 50% of medical readmissions did not have an outpatient bill between hospital stays, which suggests that facilitating prompt outpatient follow-up visits may be important in preventing poor outcomes.

Efficient engagement of the interdisciplinary team, including the patient and caregiver, and attention to care coordination and psychosocial
issues that are identified post discharge, and thus may not be anticipated or addressed by standard discharge planning processes, guided the design of the intervention. Other models of transitional care are focused more centrally on health conditions and adherence, whereas psychosocial issues are more tangential to their interventions (Bradway et al., 2011). To understand the impact of the EDPP more fully, a randomized controlled trial was designed to assess its effect on outcomes post discharge, including patient and caregiver stress, physician follow-up, rehospitalization, and mortality.

**Design and Methods**

**Study Design and Sample**

A randomized controlled trial was designed to test the model, with patients randomized to the intervention or the usual care group. Selection criteria were developed based on review of the existing literature regarding risk factors for post-discharge complications (Arbaje et al., 2008; Bowles, Foust, & Naylor, 2003; Mistiaen, Duijnhouwer, Prins-Hoekstra, Ros, & Blaylock, 1999; Naylor et al., 2004; Steeman, Abraham, & Godderis, 1997; Williams & Coleman, 2009).

Patients eligible for inclusion in the study were those 65 and older admitted for an inpatient hospitalization at the study hospital between June 2009 and January 2010 and discharged home with 7 or more medications (based upon the hospital mean of 7 discharge medications for adult inpatients) and at least one of the following criteria documented in the EMR:

1. lives alone;
2. is without a support system for care post discharge, as documented in the nursing admission assessment;
3. has a high risk for falls, as documented in the nursing admission assessment;
4. has at least one previous inpatient admission to the study hospital in the 12 months prior to the current admission;
5. is without a source of emotional support, as documented in the discharge planning assessment;
6. has an in-depth psychosocial need (IDPN, defined by inpatient hospital discharge planning staff as a non-medical issue that may complicate care, such as financial or insurance problems, coping issues, family conflict, and other similar factors) documented in the discharge planning assessment.

Patients unable to effectively communicate in English, discharged to a skilled nursing or other institutional care facility, or those involved in another transitional care intervention were excluded from the research. Marital status, race, and ethnicity were recorded in the electronic record based on patient self-report according to options specified by the Office of Management and Budget for the classification of data on race and ethnicity.

A power analysis determined that a sample size of 360 per group was required to detect a 40% difference in readmission rates at 80% power with \( \alpha = .05 \). A randomized block design with a block size of six allocated patients to intervention and usual care groups to achieve a total sample size of 720 patients. The block design served to ensure adequate staff resources was available to provide EDPP services to every patient randomized to the intervention group.

The research protocol was reviewed and approved by the Rush University Institutional Review Board. Resources did not allow us to consent all potentially eligible patients prior to discharge. Eligibility could only be determined post discharge based on researchers’ selection criteria. During the study period, a flyer briefly describing the project and indicating that patients might receive a post-discharge telephone call inviting them to participate was distributed to every patient admitted to the acute hospital. The IRB granted a waiver of written consent. Social workers utilized a standardized script to obtain verbal informed consent at their first contact.

Of the 1780 patients assessed for eligibility, 874 were deemed ineligible as their actual discharge disposition was a skilled nursing facility or other institutional setting, not home to the community (Figure 1). Researchers randomized 906 patients between June 2009 and January 2010. Of these, 35 individuals were determined to be ineligible at the point of consent due to a post-discharge admission to a skilled nursing facility. Of the 455 randomized to the intervention group, researchers were able to contact 428, and 364 consented to participate. Four participants later withdrew. Thirty-one participants in the intervention group were lost to follow-up for the 30-day follow-up survey. However, administrative data on readmissions and mortality are present for all participants.
Of the 451 randomized to the usual care group, researchers attempted to contact 417. Initially, 364 patients consented in the usual care group but 4 withdrew. Researchers did not attempt contact with the remaining patients randomized to usual care as the target of 360 consented participants had been reached. Researchers were unable to contact 38 patients in the usual care group and later determined through the Social Security Death Index that 20 of these were deceased at 30 days post discharge. Due to the consent protocol, these 20 deceased patients were unable to consent to

![CONSORT flow diagram](https://academic.oup.com/gerontologist/article-abstract/53/3/430/837749)

Figure 1. CONSORT flow diagram.
participation in this study. Thus, approval was sought and obtained from the Institutional Review Board in order to include these participants in demographics and mortality data analysis.

Enhanced Discharge Planning Program

EDPP is a social work-based telephone intervention developed at an urban medical center in Chicago, IL for discharged medical and surgical inpatients over the age of 65 judged to be at risk for post-hospital medical or psychosocial complications. Referrals are generated through an automated daily report of hospital discharges utilizing risk criteria documented in the patient’s EMR. The model involves the creation of a personalized intervention plan addressing both psychosocial and health issues, including connecting older adults to community resources, and collaborating with health care professionals such as the discharge planning team, home health providers, and physicians. Use of social workers in this role capitalizes on the existing ability of these professionals to transverse silos of care across acute, skilled, and community settings. These social workers work collaboratively with the entirety of the interdisciplinary team involved in a particular patient’s care.

The EDPP Intervention

The EDPP intervention began with a review of a referred patient’s EMR for relevant medical and psychosocial information. Standardized questions to assess domains of risk included: How have you been doing since you were discharged?; Did you receive any follow-up services?; Were you instructed to complete any medical follow-up?; Has this been completed?; Have you made any medical follow-up appointments?; Do you have a primary care physician?; Have you filled your prescriptions?; Do you have any questions about your medications?; What kinds of support systems are available to you if you need help?; How confident are you that you could rely on these people if you needed assistance? The intervention was not rigidly scripted so that it could be most responsive to patient identified needs. However, critical elements of the interview included confirmation of the plan for follow-up medical care, transportation plans, medication problems and adherence, knowledge of “red flags” (Coleman et al., 2006), and receipt of services, such as home health, ordered at discharge.

The EDPP worker confirmed the post-discharge plan of care and identified potential problem areas that required additional assessment. The EDPP social worker contacted patients or caregivers by telephone within 2 working days of discharge to assess the patient’s post-discharge adjustment and needs. Given the level of frailty and impairment in this population, patients sometimes deferred to a caregiver for the bulk of the interaction. The ability to review the EMR prior to the assessment telephone call helped the EDPP social worker to identify who was likely to be the best informant for planning and care or if there were communication barriers with the patient. The EDPP social worker administered the baseline survey to consenting patients at the end of the first telephone contact. After the initial telephone call, the EDPP social worker followed up with service providers if services, such as home health, were ordered in the hospital but had not yet started. Social workers determined if patients had obtained medications ordered at discharge, had made an appointment for outpatient follow-up with the physician, and had transportation for the visit. Workers also assessed for needs that may have emerged only after discharge, both concrete, such as home delivered meals, and psychological, such as anxiety. Cases were closed once the EDPP social worker confirmed that a plan was in place to meet patient needs, both health and psychosocial. This included scheduling follow-up appointments, if necessary, and arranging for transportation, verifying services that had been ordered at discharge had started and confirming any new service referrals, to respond to needs that emerged after discharge, were made. Prior to terminating the intervention, patients, and caregivers were made aware of the option to connect back with EDPP workers for assistance in the future and the worker ensured that the patient had the contact information.

The EDPP social worker read the consent script to participants randomized to the intervention group during the first telephone contact, within 2 days of discharge. If the patient consented to participate in the study, the EDPP social worker continued to provide the clinical intervention, recording data on problem areas identified and interventions performed. A follow-up survey phone call was completed 30 days after hospital discharge.

Usual Care

The usual care group received the conventional care given to all patients discharged from the medical
center which did not include any post-discharge contact between hospital staff and patients or caregivers. Study personnel intentionally had no contact with usual care participants until 30 days after hospital discharge to preserve research integrity and prevent data contamination. Thus, the usual care group did not receive a baseline survey to ensure the usual care group received only conventional care in the 30-day post-discharge interval.

Project research personnel contacted the usual care group patients by telephone 30 days after discharge to obtain verbal consent for study participation and administered the follow-up survey to consenting patients at that time. At the conclusion of the follow-up telephone call, usual care group participants were given information regarding the hospital-based older adult resource center.

Outcomes

Primary outcomes were patient and caregiver stress, physician follow-up, readmission, and mortality. Patient and caregiver stress were asked if they agreed with the statement “Since I/[patient’s name] left the hospital, managing my/his/her health needs has been stressful for me/my family/other caregivers.” Patient respondents assessed caregiver stress as well as their own. Caregiver respondents assessed patient stress as well as their own. Only informal caregivers, defined as a family member or other single designated non-professional primarily responsible for the patient’s care were included as proxy respondents. Patients were the respondents in 70% of the cases, 67.9% of the intervention group, and 71.9% of the usual care group ($p = .252$).

Follow-up telephone surveys took place between 30 and 60 days post discharge.

Both intervention and usual care groups were asked if managing the patient’s health care needs was stressful with the same item used in the baseline intervention group survey. Respondents were also asked about health care utilization with three dichotomous items indicating whether the patient had communication with the physician, scheduled an appointment with physician, and attended an appointment with their physician since discharge.

Readmissions and mortality were important secondary outcome measures. Researchers utilized Medicare and Medicaid claims data for patients with these primary payers. Patient self-report was utilized for patients without this coverage. Patients were prompted to report any overnight hospital admissions since their given discharge date for the index admission.

Mortality at 30 days post discharge was ascertained through the medical record or via the Social Security Death Index if not indicated in the medical record.

Statistical Analysis

Baseline and 30-day follow-up data were collected to test the differences in outcome measures between the two groups. For the follow-up outcome measures of hospital readmissions and patient care and activity, comparisons were conducted between 360 intervention and 360 usual care participants. For mortality, comparisons were made between 360 intervention and 380 usual care groups to include all participants, regardless of whether they survived to 30 days post discharge. Comparisons were also conducted on 30-day mortality for the original intent-to-treat sample ($N = 906$). The following baseline characteristics were collected and shown in Table 1: age at discharge, age categories (quartiles), length of stay for index hospitalization, marital status, geographic location, primary type of insurance, admission source, admission type, admission to the study hospital in past 12 months, time between prior and index admissions, current living situation, support system for care, high risk for falls, number of IDPNs, presence of IDPN, coping, and follow-up pain scale. Differences between the intervention and usual care groups were examined on all of the characteristics mentioned previously. Chi-square and $t$ tests were used to assess differences between groups on categorical and continuous variables, respectively. Measures associated with EDPP enrollment in the binary analyses were included in final regression models. All outcomes were binary; therefore, researchers ran logistic regression models to test whether enrollment in EDPP was associated with each outcome, after controlling for the independent variables identified in the bivariate analyses. Additionally, frequencies of patient problems and issues identified at assessment were generated for the intervention group ($N = 360$).

All statistical analyses were conducted in SAS (SAS Institute Inc., Cary, NC), version 9.2 and the significance level was set $a priori$ at $<0.05$.

Results

Intervention and usual care participants were similar on demographic characteristics (Table 1).
Usual care participants were more likely to have a primary insurance other than Medicare or Medicaid, to have been admitted to the study hospital within the last 12 months, and to have entered the hospital for an emergency or urgent matter, rather than elective.

Intervention and usual care group participants were also similar with respect to risk factors for adverse post-hospitalization outcomes (Table 2) although a higher proportion (8.6%) of intervention group participants than usual care participants (4.4%) had difficulties coping with diagnosis and treatment by discharge planners during hospitalization. Coping with diagnosis and treatment, was the only IDPN on which intervention and usual care groups differed.

For the 360 patients enrolled in EDPP, the mean duration of the intervention was 5.8 days ($SD = 11.3$; Table 3). The mean number of contacts, including those to health care professionals and others on the patient's behalf as well as contacts with a patient or caregiver, was 5.4 ($SD = 6.3$).

EDPP social workers identified problems during the post-discharge telephone assessment in 300 (83.3%) intervention group participants. IDPNs were recognized in the inpatient record by hospital staff for only 80 (26.7%) of the patients for whom the EDPP social worker identified a need, whether because the problem was not disclosed by patients or had not yet occurred (Fabbre, Buffington, Altfeld, Shier, & Golden, 2011).

Problems covered a broad range of issues (Table 3). Difficulties in adjusting to illness or caregiving were problematic for significant fractions of those served. Almost half of this group (45.8%) identified a problem in self-management, understanding, and complying with the care plan. This included understanding and integrating changes to diet, performing health-related tasks such as wound care, and keeping track of the plan for others on the patient's behalf as well as contacts with a patient or caregiver, was 5.4 ($SD = 6.3$).
ongoing care after the time immediately post discharge. One-third (34.4%) indicated that caregiver burden was significant.

Problems in obtaining home health services ordered in the hospital emerged as a prevalent area of need. Of the 179 intervention group participants discharge home with home health, 51.4% had problems relating to home health services. The most common issue was a delay in service, with 20% of these participants experiencing a delay with some aspect of their care.

Bivariate analyses of outcomes by treatment group as measured at 30-day follow-up are shown in Table 4. There were no differences between groups on caregiver or patient stress, self-rated health, or pain. There were significant differences...
between the intervention and usual care groups regarding both communication with physicians post discharge and follow-up with medical care. Intervention group patients were significantly more likely than usual care patients to have communicated with their physicians (90.3% vs 81.9%) as well as scheduled (92.5% vs 81.4%, p < .001) and completed (74.9% vs 57.4%, p < .001) follow-up physician visits by 30-day contact. However, there were no differences between groups regarding rehospitalization within 30 days of hospital discharge. Mortality was analyzed utilizing the intent-to-treat (N = 906) sample (Table 5). There were 14 deaths in the intervention group (3.1%) compared with 20 (4.4%) in the usual care group (p = .282).

Multivariate logistic regression models that adjusted for covariates had similar outcomes (Table 6). Intervention group patients were significantly more likely to have made (OR = 2.70) and kept (OR = 2.09) follow-up physician appointments than were those in usual care. There were no significant differences between groups on patient stress, caregiver stress, patient assessment of health at follow-up, or rehospitalization. There were no differences between groups on mortality using the intent-to-treat sample (OR = 1.54).

As a check of the robustness in restricting the sample to participants with Medicare or Medicaid in the readmissions analysis, we re-estimated the models for caregiver stress, understanding the plan of care, physician follow-up, and mortality for participants with Medicare or Medicaid only and found the results to be similar to those for the full sample (results not shown).

More than one-quarter (29.2%) of intervention patients (105/360) initiated contact with EDPP social work staff for additional assistance after their cases were resolved and closed by the worker. Further analyses revealed that one-third (33.2%) of patients who needed assistance beyond the 2-day assessment call, as well as 20% of those who had no apparent needs at the first contact, sought additional help, although those who initially had more complex problems were more likely to ask for more help ($\chi^2 = 6.23$, $p = .012$).

### Implications

Results of this study suggest that a telephone post-discharge care intervention by an experienced social worker can have positive impacts on several important transitional care outcomes. Older adult patients are likely to have unmet needs for support,
information, and services following hospital discharge. Problems in receiving home health services were experienced by half of those for whom home health was ordered at discharge. Medication management was another prevalent problem that has clear links with health outcomes and readmissions. More subtle issues such as caregiver burden, coping with change in health status, or mental health problems also emerged upon assessment. This constellation of needs may be associated with barriers to timely medical follow-up and adherence to medical plan of care. EDPP patients were more likely than those in the usual care group to follow-up with their physicians on a timely basis. However, the intervention did not have an impact on the likelihood of rehospitalization within 30 days of the index hospitalization. In the intent-to-treat analysis, there was not a statistically significant difference between groups. Future studies should evaluate whether obtaining informed consent at the time of discharge impacts the outcomes.

An additional limitation is the absence of information regarding how use of proxy respondents may have impacted outcomes. Inclusion of both caregiver and patient respondents for the same cases would have been helpful to answer this question. Exclusion of patients who did not speak English also limits the generalizability of researchers’ results. The intervention is being expanded through the addition of a bilingual, bicultural Latina social worker to the EDPP team. Future studies should include non-English speaking patients to assess the efficacy of EDPP for this population. The study also depended on inpatient assessment and discharge planning documentation utilized at the study hospital and may not be relevant for other hospitals.

Table 6. Odds Ratios for Intervention vs Usual Care Groups for Each Outcomea

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Odds ratio</th>
<th>95% CI lower</th>
<th>95% CI upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient stress</td>
<td>0.85</td>
<td>0.61</td>
<td>1.19</td>
</tr>
<tr>
<td>Caregiver stress</td>
<td>1.02</td>
<td>0.73</td>
<td>1.42</td>
</tr>
<tr>
<td>Physician appointment made*</td>
<td>2.70</td>
<td>1.64</td>
<td>4.45</td>
</tr>
<tr>
<td>Physician appointment kept*</td>
<td>2.09</td>
<td>1.51</td>
<td>2.89</td>
</tr>
<tr>
<td>General health rating (excellent/very good vs good/fair/poor)</td>
<td>1.27</td>
<td>0.85</td>
<td>1.88</td>
</tr>
<tr>
<td>30-day mortality (N = 906)</td>
<td>1.54</td>
<td>0.76</td>
<td>3.10</td>
</tr>
<tr>
<td>Readmission within 30 days</td>
<td>1.11</td>
<td>0.76</td>
<td>1.62</td>
</tr>
</tbody>
</table>

*aAll models except mortality and readmission are adjusted for admission type, prior admission to study hospital in past 12 months, risk IDPN coping status, and insurance status. Mortality was adjusted only for coping because the other covariates were not significant when included in the model and readmission was adjusted for all of the above except insurance status.

*p < .0001.
medicare centers whose procedures and assessments may be different.

Results from this study highlight that complex patient situations often go beyond the medical to encompass the social, emotional, and environmental. The success of the EDPP model in impacting patient communication and follow-up with post-discharge care may relate to the identification and elimination of non-medical barriers preventing patients from fully adhering to their post-discharge medical plan of care. Findings from this study have implications for the delivery of transitional care and care coordination, which may be critical to the achievement of outcomes targeted by health care reform.

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